

C

Reg. No. :

--	--	--	--	--	--	--	--	--	--

**Question Paper Code: 93303**

B.E./B.Tech. DEGREE EXAMINATION, NOV 2023

Third Semester

Computer Science Engineering

19UCS303 – Digital Electronics

(Regulation 2019)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. In which code the successive code characters differ in only one bit position? CO1- R  
(a) gray code (b) excess 3 code (c) 8421 code (d) algebraic code
2. Infer the Boolean expression of borrow in half-subtract or CO1- R  
(a)  $AB'$  (b)  $A'B$  (c)  $AB$  (d)  $A'B'$
3. Show the input value for S and R whether it is Reset state. CO1- R  
(a) 00 (b) 01 (c) 10 (d) 11
4. Which is not belong to the categories of hazard. CO1- R  
(a) Static (b) Dynamic (c) Static-1 (d) Static-9
5. CMOS technology is used in \_\_\_\_\_ CO1- R  
(a) Inverter (b) Microprocessor  
(c) Digital logic (d) Both microprocessor and digital logic

PART – B (5 x 3= 15 Marks)

6. State and prove De-morgan's theorem CO1- R
7. Design circuit to detect invalid BCD number CO1- R
8. Differentiate Moore and Mealy state machine CO1- R
9. Explain the steps involved in state reduction CO1- R
10. Draw the CMOS inverter circuit CO1- R

PART – C (5 x 16= 80Marks)

11. (a) (i) Find the Min term expansion of  $f(a,b,c,d) = a'(b'+d) + acd'$ . CO1- App (8)  
 (ii) Simplify the expression using k-map CO1- App (8)  
 $F( W,X,Y,Z) = (1,4,6,7,8,9,10,11,15)$

Or

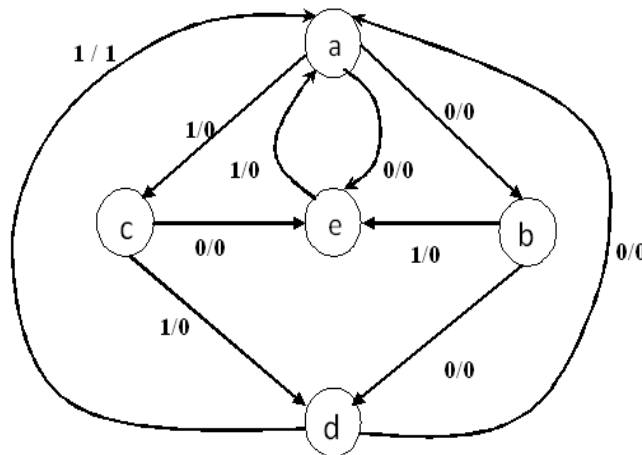
- (b) Simplify the following Boolean function by using the Tabulation method CO1- App (16)  
 method  
 $F= (0, 1, 2, 8, 10, 11,14, 15).$

12. (a) Design BCD to excess 3 code converter CO2- App (16)

Or

- (b) Elaborate about half subtractor and how full subtractor can be implemented using 2 half adders with the necessary truth table and equation CO1- U (16)

13. (a) Design a sequential circuit for a state diagram shown in the following figure. Use state assignment rules for assigning states and compare the required combinational circuit with straight binary assignment CO2- App (16)

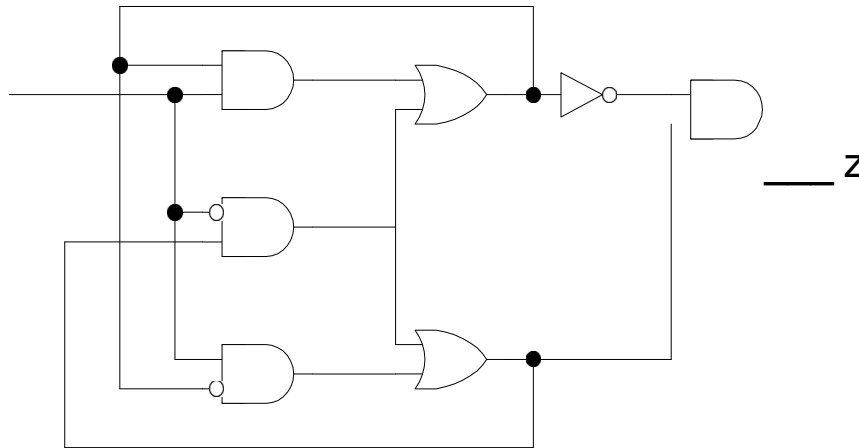


Or

- (b) Explain different types of about shift registers in detail with the necessary diagram CO3- App (16)

14. (a) Write logic equations for the excitation variables in terms of the circuit inputs and secondary variables:

CO2- App (16)



Or

- (b) Design a asynchronous sequential circuit with 2 inputs T and C. The output attains a value of 1 when  $T = 1$  & c moves from 1 to 0. Otherwise the output is 0. CO2- App (16)

15. (a) Implement the switching functions. CO2- App (16)

$$Z1 = ab'd'e + a'b'c'd'e' + bc + de$$

$$Z2 = a'c'e$$

$$Z3 = bc + de + c'd'e' + bd$$

$$Z4 = a'c'e + ce \text{ using } 5 \times 8 \times 4 \text{ PLA}$$

Or

- (b) (i) Implement the following min terms using PLA CO2- App (8)

$$F1(A, B, C) = \sum(0, 1, 2, 4)$$

$$F2(A, B, C) = \sum(0, 5, 6, 7)$$

- (ii) Discuss the characteristics of various digital logic families CO1- U (8)

